

What is claimed is:

- 1 1. Methods for the production of mixed alcohols including the steps of:
  - 2 using a sulfided, nanosized transition metal catalyst selected from Group VI metals;
  - 3 nanosizing the Group VI transition metal catalyst;
  - 4 suspending the catalyst in a solvent to form a slurry;
  - 5 contacting said slurry with gases including carbon monoxide and hydrogen at a
  - 6 temperature in the range of about 250 to about 325°C and at a pressure in the range of about 500
  - 7 to about 3000 psig, to thereby produce mixed alcohols.
- 1 2. The method of claim 1 wherein the nanosized Group VI transition metal catalysts is
- 2 sulfided prior to its use in producing mixed alcohols from gases including carbon monoxide and
- 3 hydrogen.
- 1 3. Nanosized Group VI transition metal catalysts for use in producing mixed alcohols from
- 2 gases including carbon monoxide and hydrogen.
- 1 4. The nanosized Group VI transition metal catalysts of claim 3 including sulfur
- 1 5. All methods for the production of mixed alcohols taught herein.
- 1 6. All catalysts for the production of mixed alcohols taught herein.